CHAPTER V

GEOLOGY AND SUBSIDENCE

PARTS **Page**

APPENDICES

PLATES

Revised 5/07
Revised 3/08
Revised 6/08

File in:
- ❑ Confidential
- ❑ Shelf
- X Expandable

Refer to Record No 0037 Date 06132008
In C/0150015 2008 Incoming
For additional information

2. The effect of the weather on mitigation plans - In some cases, it may be practical to perform repair work in the winter or spring while in other cases it would not. For instance, it would probably not be practical to repair a road embankment, where compaction is critical, during winter weather. However it may be practical to repair a fence. Another example would be if it was necessary to remove and stockpile topsoil to perform mitigation work. It would be better to perform the work in the summer when the soil could be properly segregated than to try to do the work in the spring when conditions are normally muddy.

3. The effects of mitigation work on non-renewable resources -The best example of this situation is the case where it is necessary to regrade an area to mitigate the effects of subsidence. If it is necessary to remove the topsoil prior to regrading, it would be better to wait until all probable subsidence had occurred than to risk topsoil contamination through repeated removal and respreading of the topsoil should subsidence continue for several years. However in this case, it may be necessary to perform lesser or temporary mitigative work to minimize the effects of pending water on the soil resources or hazardous conditions for people, wildlife or livestock.

As discussed above, we do not believe it is possible to commit to a specific timetable for performing subsidence mitigation. However, when subsidence mitigation is required by applicable laws and regulations, mitigation will be performed as soon as practical taking into consideration the above items.

UMC 817.126

As described in the subsidence control plan, under UMC 784.20, the two (2) perennial streams in the permit area will be protected by buffer zones (Refer to Plate V-5). There are no impoundments of 20 acre-feet or more in the permit area.

Underground water rights described in Chapter VI, under UMC 784.14, show that the Town of Emery maintains two (2) wells developed in different aquifers within the Ferron Sandstone formation. These wells are used as a backup water source to the town's present water supply system which relies on surface water from Muddy Creek. Emery Town Well No. 1 is developed in the Lower Ferron aquifer, which lies well below current mining activities. Well No. 2 is developed in the Middle and Upper Ferron aquifers which are directly below and above the seam being mined. No adverse impacts to either well are anticipated since the wells are located about 3 to 4 miles from the mine and are up gradient within the regional ground water flow pattern. If it is proven that mining activities adversely impact the Emery Town Wells and the towns surface water system becomes inoperable, Consol commits to providing an alternative source of water, per R645-301-731-530. If the town of Emery surface water system becomes inoperable and the backup wells are needed, Consol will replace the water that was adversely impacted by mining. Consol will commit to hauling water to the Emery treatment facility until the towns surface system becomes operable, an alternative source is secured, or the aquifer recharges as outlined in the hydrologic model. Static water level readings taken from wells maintained as part of the mine's ground water monitoring program also indicate that no disruption of the aquifers in the vicinity of the town's wells has occurred.

Underground operations at the Emery Mine are not conducted beneath or in close proximity to any public buildings, including churches, schools, hospitals, court houses, and government offices.

Revised 12/07
Revised 06/08

APPENDIX V-7

2008 PRE-SUBSIDENCE SURVEY
LIFE OF MINE PANELS

Pre-subsidence Survey
Prior to Full Extraction at Panels
1 – 4 North,
1 – 5 and 7 – 13 West,
8 South, and
5 West Mains

Emery Mine
Consolidation Coal Company
Emery County, Utah

June 2008

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SECTION 1

INTRODUCTION

The purpose of this report is to present baseline surface conditions prior to full extraction operations at several panels in the Consolidation Coal Company (CONSOL) Emery Mine, Emery County, Utah. The panels covered in this report include the following:

- Panels 1 through 5 West,
- Panels 7 through 13 West,
- Panels 1 through 4 North,
- Panel 8 South,
- The 5th West Mains, and
- The area between Panels 1 West, 2 North, and the Permit Boundary.

Two previous presubsidence surveys covering the 14th and 15th West Panels and the Zero North, 4th East, and 6th West Panels have already been performed and submitted in Spring 2007 and Fall 2007, respectively. This document covers the remaining area scheduled to undergo full extraction within the current permit boundary.

This document is intended to be part of a Subsidence Control Plan as required in Section R645-301-525.100 of the Utah Administrative Code. Recording initial surface conditions will facilitate locating and mitigating any areas determined to be adversely affected by future subsidence. As part of the pre-subsidence survey, the locations and conditions of the following features were recorded:

- Structures (e.g. buildings, corrals, roads)
- Fences
- Utilities (e.g. power, telephone, gas, and water lines, water wells)
- Surface drainages (e.g. natural channels, irrigation ditches)

This report references the original Pre-subsidence Survey performed prior to mining operations in 1980 (Valley Engineering, 1980). The feature numbers given in this document correspond to those described in the 1980 report. These features were surveyed in the field in spring 2008, and any differences and/or changes from the conditions noted during the 1980 survey are noted both in the text and figures of this document. This report supercedes the Valley Engineering survey where conflicts exist.

CHAPTER 2
SURVEY AREA OBSERVATIONS

2.1 GENERAL AREA DESCRIPTION

This pre-subsidence survey covers approximately 1,475 acres of primarily undeveloped land with approximately 320 acres of irrigated fields and grazing pastures. The ground surface is generally flat with some small, steep hills formed by eroded washes and resistant bedrock outcrops. A perennial stream named Christiansen Wash runs through the center of the survey area and drains in a general southeasterly direction. This stream is used both to supply irrigation water and to receive irrigation returns for surrounding agricultural land via a complex network of irrigation ditches, piping, and storage ponds. Structures within the survey area include one barn which is in fair condition and several corrals and sheds that are in fair to dilapidated condition. Nearly all of the structures are built from unfinished and/or rough cut timbers and appear to have been present for several decades. A large corrugated metal shed, however, which is located north of the 4th West Panel, has been constructed within the last few years and is in excellent condition. There are several fences in the area in various states of repair. Most of the fences are constructed with barbed wire strung between posts made from natural rough cut tree limbs. Some fences use finished lumber fence posts or metal tee-stakes and tubing. There are two paved roads, two gravel-surfaced roads, and several unimproved dirt roads in the survey area. The paved and gravel-surfaced roads are in good condition, and the dirt roads range from good to poor condition.

Utilities within the survey area include overhead power lines and a buried water line. All of the features (structures, fences, roads, drainages, utilities, etc.) located during the pre-subsidence survey are shown on Figure 1. CONSOL has signed a County Road Repair Agreement with Emery County to mitigate any subsidence damage to roads within the full extraction area. Similarly, CONSOL has entered into a Power Line Repair Agreement with

Pacificorp to mitigate subsidence damage to power lines within the full extraction area. An emergency shutoff valve has been installed on the buried water line just north of where subsidence is expected to occur. A buried fiber optic cable formerly located in the full-extraction area has been relocated to the west.

2.2 INDIVIDUAL FEATURE DESCRIPTIONS

Each numbered feature on Figure 1 within the survey area is described below. The numbers for each feature are identical to those used in the 1980 Pre-Subsidence Survey. Refer to Section 6 for photographs. Features within the 14th/15th West, 0 North, 6th West, and 4th East Mains have already been surveyed and are described in reports submitted in Spring and Fall 2007.

Feature 72. Irrigation Ditch. This feature has been updated from the Valley Engineering (1980) report. This ditch has earthen banks, is approximately three feet deep, and ranges from five to eight feet wide. There was no water within the ditch when it was surveyed in May 2008, but moist soil in its bottom suggested that it had been used recently. Water within the ditch flows from west to east until it reaches the paved road. From this point, water is diverted to the south through a culvert under the gravel road, and then east again under the paved road.

Feature 73. Pond. This feature has been updated from the Valley Engineering (1980) report. The pond is approximately 100 feet in diameter and was partially full when it was surveyed in May 2008. An approximately 5-foot tall earthen embankment runs along its downstream edge.

Feature 74. Irrigation Ditch. This feature is essentially unchanged from how it is described in the Valley Engineering (1980) report, which states the following: "The earthen

bank ditch is approximately 1.5 feet to 2 feet wide and 1 foot to 1.5 feet deep. Vegetation is growing along its banks."

Feature 85. Dirt Road and Fences. This feature is essentially unchanged from how it is described in the Valley Engineering (1980) report, which states the following: "The road is a two-track, single lane, dirt road. The road surface consists of the natural sand and clay that is in the area, and has been compacted by vehicles that travel the road. The fences in the area are barbed wire with either natural rough cut wood posts or steel posts." The fences are in fair to good condition.

Feature 86. Barbed Wire Fence. This feature has been updated from the Valley Engineering (1980) report. The fence, which is constructed with rough cut timber posts, is in dilapidated condition. Several of the posts are missing, and many of the barbed wire strands are loose and partially buried under the ground surface.

Feature 87. Small Creek and Fence. The description of this feature has been updated from the Valley Engineering (1980) report. The fence is constructed of rough cut timber posts and barbed wire and is in good condition. The "small creek" was incorrectly identified in the 1980 survey. The survey area is relatively flat, dry, and contains no established stream channels. The 1980 survey shows several irrigation ditches overlying the Zero North Panel which drain toward this "stream channel," which was actually an irrigation outflow ditch. During the 2007 survey, it was evident that many of the irrigation ditches had been allowed to fill in, including the "stream channel" identified in the 1980 survey.

Feature 89. Quarter Section Marker. This feature remains the same as described in the Valley Engineering (1980) report, which states the following: "This quarter section corner marker is in Range 6 East Township 22 South. It divides sections 22 and 27. The marker is a metal cap on a short steel pipe."

Feature 90. Ponds. The description of this feature has been updated from the Valley Engineering (1980) report. The ponds were empty during an October 2007 survey, but four earth berms were present that appeared capable of impounding water. The berms are approximately 3 feet tall. Three of the berms are clustered together in a north to south alignment, and one berm is located a few hundred feet to the northeast. A dry irrigation ditch located west of the three clustered ponds appears to serve as a water source. A dilapidated wooden corral and small shed is located just north of the three clustered ponds.

Feature 93. Irrigation Ditches and Farmland. The description of this feature has been updated from the Valley Engineering (1980) report. It contains 4 irrigated fields that comprise a total of 48 acres of cultivated land. Irrigation water flows from northwest to southeast and is supplied by the ditch running along the gravel road located east of the field.

Feature 96. Cattle Guard. The description of this feature has been updated from the Valley Engineering (1980) report. The cattle guard was not present during the May 2008 survey.

Feature 97. Dirt Road, Utility Power Line, and Fence. The description of this feature has been updated from the Valley Engineering (1980) report. The dirt road is approximately 24 feet wide with a surface constructed from imported, compacted gravel. The road is in very good condition. The utility power line hangs from 30 to 40 foot tall wooden poles, and is in very good condition. The poles appear relatively plumb. The barbed wire fence is located on the west side of the road and has posts constructed from rough cut timbers and metal tee-stakes. The fence is in good to excellent condition.

Feature 98. Small Creek. The description of this feature has been updated from the Valley Engineering (1980) report. The creek is called Christiansen Wash. During the October 2007 survey, flow in the creek bed was approximately 3 feet wide. The creek flows to the

southwest and discharges into Quitchupah Creek. The creek flows under the paved access road for the 4th East Portal via a 60-inch diameter coated corrugated steel pipe that is in very good condition.

Feature 103. Farm Land, Corrals, Ponds, and Fences. The description of this feature has been updated from the Valley Engineering (1980) report. A fenced and gated hay storage area is located in the southeast corner of this feature. The fence and gate are in good condition. An unimproved dirt road (good condition) leads from the gravel road up to the hay storage area. Three small ponds are located north of the hay storage area. The two ponds that are adjacent to the hay storage area measure approximately 100 feet in diameter and are up to 5 feet deep. A larger pond measuring 400 feet by 200 feet is located about 700 feet to the northwest. Irrigated farm land and corrals surround the hay storage area. The corrals are constructed from metal tee stakes, finished and unfinished timbers, and metal tubing. They appear to be in good condition. The irrigated agricultural land consists of three fields totaling 70 acres. Irrigation is performed with a network of irrigation ditches that flow in a northwest to southeast direction as well as a buried plastic water line. The water line is 12" in diameter and runs north to south for 900 feet under the northwestern-most irrigated field of this feature. Two additional buried water lines are scheduled for construction during summer 2008. An unimproved dirt road in fair condition located about 800 feet north of the hay storage area provides additional access to the fields and corrals.

Feature 107. Corrals and Covered Shelters. The description of this feature has been updated from the Valley Engineering (1980) report. The corrals and shelters are in poor condition and are constructed of rough cut lumber and rough sawn boards. Several pieces of the fence are missing. The land slopes steeply downward just to the south of the corrals toward a broad, flat plain. During site reconnaissance, a marshy, grassy area was observed near the base of this slope. This marshy area corresponds to SP-9 on Plate VI-2/VI-2A and in the text of Chapter VI Volume 1 Section VI.A.2 (Springs and Seeps) of the Emery Mine Permit

(Consolidation Coal Company, 1990). As indicated in that permit document, SP-9 is the result of irrigation water and not a spring.

Feature 108. Corral. The description of this feature has been updated from the Valley Engineering (1980) report. This feature is in fair condition. It is constructed from square rough-cut wood posts, unfinished wood posts, and steel fencing reinforcement. Most of the corral is fenced with barbed wire. During site reconnaissance in May 2008, several hay bales were being stored in the corral, suggesting that it was being used

Feature 109. Farm Land. The description of this feature has been updated from the Valley Engineering (1980) report. This area is used primarily for growing alfalfa, but there are some grassland areas used for pasture. Irrigation water is conveyed to the area via a network of piping and ditches that drains to the southeast. There is one small pond that has been constructed at this feature.

Feature 110. Corrals, Sheds, Barn, Pond, and Farm Land. The description of this feature has been updated from the Valley Engineering (1980) report. The corrals are constructed of unfinished and rough cut timbers as well as steel pipe fencing and are in good to fair condition. The sheds are constructed from rough cut logs and rough sawn boards and are in dilapidated condition. The roofs of the sheds have largely fallen apart. The barn is a two-story wood frame building in fair condition. It is founded on stacked rocks, which have started to fall over on the east side of the building. The pond measures approximately 300 feet long by 100 feet wide and has an earthen embankment that is approximately 10 feet tall on its east side. Irrigated fields of hay and grass covering an area of approximately 80 acres are located to the east and southeast of the corrals, barn, and pond.

Feature 111. Gravel Road, Utility Power Lines, Telephone Lines, and Fence Lines. The description of this feature has been updated from the Valley Engineering (1980) report. The road

is surfaced with asphalt and is in good condition with few, if any cracks. An improved road surfaced with compacted gravel intersects the paved road from the west. The gravel road is in good condition. An overhead electric power line is located along the east side of the paved road and crosses over to run along the south side of the gravel road. Another overhead power line runs west to east along the north side of the gravel road, over the paved road, and across the adjacent pasture to the east. All of the power poles are in good condition, appear relatively plumb, and are about 40 feet tall. Orange markers that indicate the presence of a buried fiber optic cable are located along the north-south power pole alignment. Barbed wire fences run along both sides of the gravel and paved roads. The fences are in good to fair condition.

Feature 112. Corral. The description of this feature has been updated from the Valley Engineering (1980) report. This feature includes a corral, an animal shelter, remnants of a hay derrick, and two small ponds. The corral is constructed from rough-cut timbers, barbed wire, and conveyor belt material. It is in fair condition. The animal shelter is also constructed from rough-cut timber and is in dilapidated condition. Large sections of the roof are missing. The hay derrick is in fair to poor condition. The two ponds, which were empty during the Spring 2008 survey, are approximately 85 feet in diameter and have constructed with earthen embankments approximately 3 feet tall.

Feature 113. Corral. The description of this feature has been updated from the Valley Engineering (1980) report. The corral is constructed from both rough-cut timbers and painted metal tube fencing. The corral has been partitioned into several small areas. It is in good condition.

Feature 114. Corrals. The description of this feature has been updated from the Valley Engineering (1980) report. The corrals are constructed from rough-cut timbers which comprise the fence posts, fencing material, and sheltered areas. Hay was stored in one of the sheltered areas during the May 2008 survey. The corrals and shelters are in poor condition.

Feature 118. Section Corner Marker. This feature remains the same as described in the Valley Engineering (1980) report, which states the following: "This corner marker is located in Range 6 East Township 22 South. The marker is a metal cap on top of a short steel pipe. The marker is located at the intersection of Sections 20, 21, 28, and 29."

Feature 122. Irrigation Ditch. This feature was mapped but not enumerated in the Valley Engineering (1980) report. It consists of an irrigation ditch that conveys water from north to south along the west side of the road described in Feature 97, and then along the northwest edge of an irrigated field adjacent to the road. The ditch is approximately six inches deep and is in fair to good condition. Survey coordinates associated with this ditch are provided in Table 1.

Feature 123. Remnant Irrigation Ditch Segment. This feature was mapped but not enumerated in the Valley Engineering (1980) report. It consists of a segment of an irrigation ditch that has been allowed to fall into disrepair. The ditch contains a section of irrigation piping, and both the ditch and the piping have mostly filled in with sediment. Both the inflow and outflow to and from this ditch segment are completely filled in.

Feature 124. Shed. This feature was constructed after the Valley Engineering (1980) report was written. It is located about 1,000 feet north of the area scheduled for full extraction. The shed is built from corrugated metal with a concrete foundation and measures approximately 100 feet long by 40 feet wide by 30 feet tall. It is in excellent condition. A rock crusher is located adjacent to the shed on its northwest corner. An unimproved dirt road in fair condition leads from the graded gravel-surfaced road to the shed.

Feature 125. Water Line Manhole with Emergency Shutoff Valve. This feature was constructed after the Valley Engineering (1980) report was written. The manhole is constructed from concrete with an unlocked diamond plate steel trap door. Inside the manhole is an

emergency shutoff valve that has been installed on the water line. The valve is intended to stop the flow of water in the line in the event that subsidence causes the pipe to rupture. The water line lies approximately three feet below the ground surface. A covered water meter is located adjacent to the manhole.

SECTION 3
CONCLUSIONS

This report summarizes pre-subsidence surface conditions for the following areas at the Consolidation Coal Emery Mine, Emery County, Utah:

- Panels 1 through 5 West,
- Panels 7 through 13 West,
- Panels 1 through 4 North,
- Panel 8 South,
- The 5th West Mains, and
- The area between Panels 1 West, 2 North, and the Permit Boundary.

Surface features were inspected and surveyed in Spring 2008 prior to full extraction. Although the damage due to subsidence is generally expected to be limited, the greatest potential for adverse effects would likely be disturbances to surface drainages, ponds, roads, and utilities. By detailing pre-subsidence conditions in this report, it will be easier to both identify and mitigate negative impacts caused by future subsidence.

SECTION 4

REFERENCES

Consolidation Coal Company, 1990. Emery Mine Permit Act 015/015 Renewal. Chapter VI Volume 1 Section VI.A.3. Submitted to Division of Oil, Gas, and Mining September 9, 1990.

Valley Engineering, Inc., 1980. Consolidation Coal Company, Emery Mine, Presubsidence Survey, Structure and Renewable Resources Descriptions. Division of Oil, Gas, and Mining, Emery Permit 015/015. Chapter V, Vol. 2 of 3.

FIGURE 1

SITE PHOTOGRAPHS

Looking south from the northeast corner of Panel 3 North. The 4th East Portal is visible in the distance just right of the fence. Panels 2 North, 3 North, and 1 through 4 West are located between the portal and where this photo was taken. This area is used primarily for irrigated crops and pasture.

Looking northwest over Panels 0 and 1 North, 4 and 6 West, and 2 through 4 North in the distance.

Feature 72. Irrigation Ditch. Looking east.

Feature 73. Pond. Looking southeast.

Feature 74. Irrigation Ditch. Looking south. The ditch is located on the left side of the road and is fed by a culvert running under the road located near where this photo was taken.

Feature 85. Dirt Road and Fences. Looking west.

Feature 90. Ponds. Looking east.

Feature 93. Irrigation Ditches and Farm Land. Looking south.

Feature 93. Irrigation Ditches and Farm Land. Looking southeast. The farmland is located left of the road.

Feature 103. Farm Land, Corrals, Ponds, and Fences. Looking west at irrigated fields along Christiansen Wash.

Feature 103. Farm Land, Corrals, Ponds, and Fences. Looking north at one of the ponds.

Feature 103. Farm Land, Corrals, Ponds, and Fences. Looking southeast at one of the ponds, which was not filled when the survey was performed.

Feature 103. Farm Land, Corrals, Ponds, and Fences. Looking southwest at the fences and corrals.

Feature 107. Corrals and Covered Shelters. Looking south at west portion of corral and covered shelter. (Photo taken April 2007)

Feature 107. Corrals and Covered Shelters. Looking southeast at east portion of corral and covered shelter. (Photo taken April 2007)

Feature 107. Corrals and Covered Shelters. Looking southwest at covered shelter. (Photo taken April 2007)

Feature 107. Corrals and Covered Shelters. Looking east along northern edge of corral. (Photo taken April 2007)

Feature 107. Corrals and Covered Shelters. Looking southwest at marshy, grassy area below and south of the corral and covered shelters. (Photo taken April 2007)

Feature 108. Corral. Looking southeast.

Feature 108. Corral. Looking south.

Feature 109. Farm Land. Looking east.

Feature 109. Farm Land. Looking northeast.

Feature 110. Corrals, Sheds, Barn, Pond, and Farm Land. Looking east at barn.

Feature 110. Corrals, Sheds, Barn, Pond, and Farm Land. Looking west at barn.

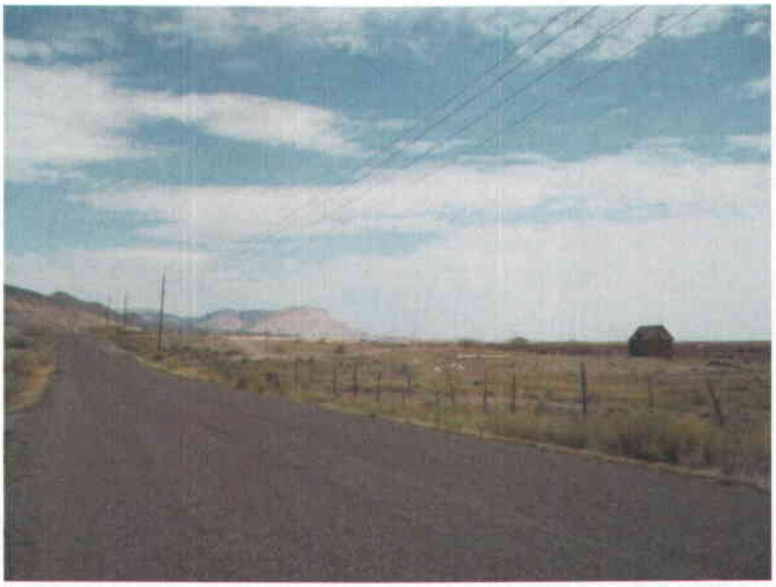
Feature 110. Corrals, Sheds, Barn, Pond, and Farm Land. Looking west-southwest at foundation of barn.

Feature 110. Corrals, Sheds, Barn, Pond, and Farm Land. Looking south at pond and barn.

Feature 110. Corrals, Sheds, Barn, Pond, and Farm Land. Looking west across pond at corrals.

Feature 110. Corrals, Sheds, Barn, Pond, and Farm Land. Looking west at pond, corral, and shed.

Feature 110. Corrals, Sheds, Barn, Pond, and Farm Land. Looking southeast at corrals, shed, and farmland.



Feature 111. Road, Utility Power Lines, Telephone Lines, and Fence Lines. Looking north along the road. The barn in Feature 110 is visible in the right of the photo.

Feature 111. Road, Utility Power Lines, Telephone Lines, and Fence Lines. Looking south along the road. The barn in Feature 110 is visible in the center-left of the photo.

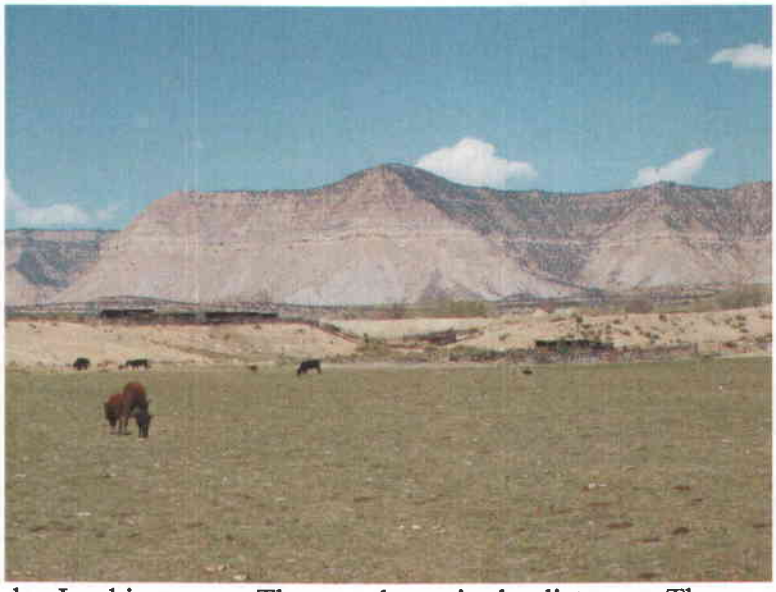
Feature 111. Road, Utility Power Lines, Telephone Lines, and Fence Lines. Looking northeast at a buried fiber optic cable manhole located below the power lines. Feature 113 is visible in the background.

Feature 112. Corral. Looking west. The hay derrick is visible in the background.

Feature 112. Corral. Looking southeast at empty pond located east of corral.

Feature 112. Corral. Looking north at corral, shelter, hay derrick, and empty pond (in foreground).

Feature 113. Corral. Looking southwest.



Feature 114. Corrals. Looking west. The corrals are in the distance. They were not directly accessible during the Spring 2008 survey due to the presence of livestock.

Feature 118. Section Corner Marker.

Feature 124. Shed. Looking west.

Feature 124. Shed. Looking southwest along side of shed at crusher.

Feature 124. Shed. Looking east.

Feature 125. Water Line Manhole with Emergency Shutoff Valve. Looking south.

Feature 125. Water Line Manhole with Emergency Shutoff Valve. View into manhole looking at emergency shutoff valve.

CHAPTER X

PART A: CULTURAL RESOURCES

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